

CLAIMS

- 5 1. A source of light of a spectrum of wavelengths extending over more than 300 nm, comprising a laser, which operates at or near its fundamental wavelength and produces pulses of a duration longer than 0.5 ns, and a micro-structured optical fibre arranged to guide the pulses, wherein the light is generated by the pulses in the fibre.
- 10 2. A source as claimed in claim 1, in which the laser is a monolithic laser.
3. A source as claimed in claim 2, in which the monolithic laser is a microchip laser.
- 15 4. A source as claimed in any preceding claim, in which the pulses of light are of a duration of more than 1 ns, such as more than 2 ns, such as more than 3 ns, such as more than 4 ns, such as more than 5 ns, such as more than 8 ns, such as more than 10 ns.
- 20 5. A source as claimed in any preceding claim, in which the pulses have a peak power of less than 50 KW, such as less than 20 kW, such as less than 15 kW, such as less than 10 kW, such as less than 9 kW, such as less than 3 kW, such as less than 1 kW.
- 25 6. A source as claimed in any preceding claim, in which the pulses have a peak power and interact with the fibre over a length of the fibre such that the peak power times the interaction length is less than 2 kWm, such as less than 1 kWm, such as less than 500 Wm.
- 30 7. A source as claimed in any preceding claim, in which the spectrum extends over more than 500 nm, such as over more than 700 nm.
8. A source as claimed in any preceding claim, in which the fundamental wavelength is longer than 600 nm.

9. A source as claimed in any preceding claim, in which the fundamental wavelength is in the range 1000 nm to 1100 nm.

5 10. A source as claimed in any preceding claim, in which the micro-structured optical fibre has a zero dispersion wavelength  $\lambda_0$  and the operating wavelength of the laser is less than the zero dispersion wavelength.

10 11. A source as claimed in any of claims 1 to 9, in which the micro-structured optical fibre has a zero dispersion wavelength  $\lambda_0$  and the operating wavelength of the laser is greater than the zero dispersion wavelength.

12. A source as claimed in any preceding claim, in which the micro-structured optical fibre has a zero dispersion wavelength between 1000 nm and 1100 nm.

15

13. A source as claimed in any preceding claim, in which the micro-structured optical fibre is arranged to support propagation of the light in a single transverse mode at all wavelengths in the spectrum of wavelengths.

20 14. A source as claimed in any preceding claim, in which the micro-structured optical fibre is arranged to support propagation of the pulses in a single transverse mode.

25 15. A source as claimed in any preceding claim, in which the micro-structured optical fibre is arranged to support propagation of light at all wavelengths in a single transverse mode.

30 16. A source as claimed in any preceding claim, in which the micro-structured fibre has a pitch greater than 2.5 microns, such as greater than 2.7 microns, such as greater than 2.9 microns.

17. A source as claimed in any preceding claim, in which the micro-structured fibre has a core having a diameter greater than 4 microns, such as greater than 4.5 microns, such as greater than 4.8 microns.

18. A source as claimed in any preceding claim, in which the micro-structured fibre has a cladding region comprising an array of holes of diameter  $d$  and pitch  $\Lambda$ , in which  $d/\Lambda$  is less than 0.7, such as less than 0.6, such as less than 0.5, such as less than  
5 0.4.

19. A source as claimed in any preceding claim, in which the micro-structured fibre has an effective nonlinear area greater than  $8 \mu\text{m}^2$ , such as greater than  $9 \mu\text{m}^2$ , such as greater than  $12 \mu\text{m}^2$ , such as greater than  $14 \mu\text{m}^2$ , such as greater than  $15 \mu\text{m}^2$ .  
10

20. A method of generating light of a spectrum of wavelengths extending over 300 nm, comprising operating a monolithic laser at or near its fundamental wavelength to provide pulses of light of a duration longer than 0.5 ns and guiding the pulses in a micro-structured optical fibre.